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Midlatitude model of the electron density gradient in the lower ionosphere

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Abstract

A model of the spectrum of the electron density turbulent fluctuations in the Earth's midlatitude lower ionosphere has been developed. The model covers the whole spectrum of turbulent irregularity scales and takes into account a set of geophysical variations in the atmosphere. To illustrate the applicability of the presented model, we have calculated the dispersion of the electron density gradient at altitudes of 70-120 km for summer and winter periods. The developed model combines the empirical model of the standard atmosphere and the theory of radiowave propagation in an inhomogeneous medium. The obtained model enables us to substantially increase the accuracy in calculating the parameters of radiopaths in a medium with electron density irregularities.